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EXAMINER	
MOSS, KERI A	
ART UNIT	**PAPER NUMBER**
1743	

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/937,208	BENSON ET AL.	
	Examiner	**Art Unit**	
	Keri A. Moss	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) 14-18 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _____ is/are rejected.

7)☒ Claim(s) 24-27 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 5/28/02 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 60/138,144.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 12/17/01.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions that are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-13 and 19-28, drawn to a hydrogen sensor comprising chemochromic material in the sensor.

Group II, claim(s) 14-18, drawn to a hydrogen sensor comprising a material that changes optical properties.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: these inventions have as a common technical feature, chemochromic material, which changes optical properties upon reaction with hydrogen. This technical feature is well known in the art (See, e.g. Cramp Column 4 lines 19-31). Therefore, it is not a special technical feature and the restriction requirement is proper.

During a telephone conversation with Mr. Paul White, Esq. on June 21, 2005 a provisional election was made with traverse to prosecute the invention of a Method and Apparatus for Determining Diffusible Hydrogen Concentrations, claims 1-13 and 19-28. Applicant in replying to this Office action must make affirmation of this election. Claims

14-18 were withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

2. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 25-28 have been renumbered 24-27.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-10 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a hydrogen sensing apparatus comprising a light source, does not reasonably provide enablement for a hydrogen sensing apparatus

without a light source. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. Claims 1-10 do not claim a light source, which is necessary for the fiber optic hydrogen sensor to sense.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting an essential element, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted element is a light source. It is unclear to what transmitted light applicant is referring as no light source is disclosed in claims 1-10.

7. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as unclear as to how the method step of depositing the sensitive layer to the optical fiber by evaporative deposition can be a structural limitation for the apparatus. The structural limitation should be recited as “wherein the sensing layer is deposited on the optical fiber.”

8. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being unclear and indefinite as it is not supported by the specification. Applicant does not enable one of ordinary skill in the art to calculate the initial diffusible hydrogen concentration using the cooling time period and the calculated diffusible hydrogen concentration.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being obvious over Buchanan (USP 5,153,931) in view of Koide (USP 5,445,725).

Buchanan teaches an apparatus for measuring hydrogen concentrations having a sensor housing (Fig. 1 part 10) with a hydrogen inlet (Fig. 1) and a sensor within the housing (Fig. 1 parts 26, 34, and 36) comprising chemochromic material that reacts with hydrogen causing a property change in the chemochromic material (column 2 lines 11-16 and 53-55) based on concentrations of the reacted hydrogen and an optical fiber for directing transmitted light to and reflected light from the sensing layer. Buchanan also discloses a sealing member connected to the sensor housing proximal to the hydrogen inlet (Fig. 1 part 14). The hydrogen-monitoring assembly is operably connected to the

sensor (Fig. 4 part 110) and adapted for measuring the property change in the hydrogen-sensing layer (Column 5 lines 38-54 and Claim 11). The property change is a change in optical transmission properties based on concentrations of the reacted hydrogen (Column 2 lines 55-57) and the sensor includes an optical fiber for directing transmitted light to and reflected light from the sensing layer (column 1 lines 15-17).

Buchanan does not teach that the sealing member connected to the sensor housing is sealably engageable with the object to define a sample area on the object from which hydrogen is allowed to diffuse. Nor does Buchanan teach that the sealing member and the sensor housing define a sample volume between the sample area on the object and the hydrogen inlet.

Koide teaches an apparatus for measuring hydrogen concentrations (Column 1 lines 11-12) having a holding cup sealably engageable with molten metal to define a sample area on the molten metal from which H diffuses (Fig. 2). The member and the sensor housing define a sample volume between the sample area and the hydrogen inlet (Column 7 lines 11-21). The Koide holding cup provides a means for isolating an area of diffusible hydrogen from an object by making a seal that prevents the gas from leaking. It would have been obvious to modify the Buchanan sensor with the Koide apparatus to isolate the hydrogen diffusing from a specific area of an object.

11. Claims 1-3, 7-11, 13, and 19-23 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jelley (USP 5,107,316) in view of Mansfeld (USP 4,221,651). Jelley discloses an apparatus for measuring hydrogen concentrations

(Column 4 lines 39-41) (See Figure 1 and respective portions of the specification). The apparatus consists of a chemochromic sensor (Column 2 lines 10-17) and an optical fiber 20 for directing transmitted light to and reflected light from 24 the sensing layer 16. Jelley discloses a hydrogen monitoring assembly (Fig. 1 parts 22 and 26) operably connected to the sensor and adapted for measuring in the hydrogen-sensing layer a change in optical transmission properties based on concentrations of reacted hydrogen (Column 4 lines 34-40). The sensing device includes a reflector layer 18 adjacent the sensing layer 16 for reflecting the transmitted light passing through the sensing layer back through the sensing layer and the optical fiber (Column 3 lines 42-45). The transmitted light has a wavelength of 850 nm (Column 3 lines 9-12). The reflector layer interposed between the sensing layer and the sample (Column 4 lines 10-12) comprises a material, palladium (Column 2 line 36), which adsorbs molecular hydrogen on a surface exposed to sample volume and releases the adsorbed hydrogen into the sensing layer (Column 4 lines 15-19). The reflector layer has a thickness range of 2.5 nm to "somewhat thicker" than 5 nm, and this reads on applicant's claimed range. The sensing apparatus includes a light source 22 for providing the transmitted light to the optical fiber 20 and a light detector 26 for receiving from the optical fiber the reflected light and for processing the reflected light to calculate an amount of hydrogen (Column 4 lines 34-40).

Jelley does not teach a hydrogen sensing apparatus with a housing that defines a sample area or sample volume and that is sealably engageable with an object from which hydrogen diffuses. Jelley also does not teach a method for measuring hydrogen

concentration by selecting from where to get the hydrogen concentration measurement on an object and sealably mounting the sensor onto the object. Jelley does not disclose calibrating the hydrogen sensor assembly.

Mansfeld discloses a method and apparatus design for measuring diffusible hydrogen from solid metals by placing the hydrogen sensor against the surface of a metal part without spilling or leaking. Mansfield discloses a sensor housing with a hydrogen inlet (Figs. 2 and 4, part 24) sealing member (Fig. 2, part 26) sealably engageable with the object from which hydrogen diffuses and wherein the sealing member and sensor housing define a sample volume between the sample area on the object and hydrogen inlet of the sensor (Column 3 lines 25-29). This hydrogen sensing design includes a hydrogen monitoring assembly (Fig. 5 part 56) operably connected to the sensor (Fig. 5) and adapted for measuring the property change in the hydrogen sensing area (Column 2 lines 13-16) and determining a diffusible hydrogen concentration based on the measured property change, the sample area and the sample volume (Column 3 lines 25-29 and Column 4 line 38-Column 5 line 15). The method comprises the steps of selecting from where to get the measurement (Column 1 lines 58-62), sealably mounting the hydrogen sensor assembly with a housing that defines a sample area and a sample volume (Column 3 lines 25-29) on a selected portion of the object (Column 1 lines 58-62), allowing the hydrogen sensor to react with the captured hydrogen for a predetermined sample time (Column 5 lines 21-23), measuring an amount of change in a physical property of the hydrogen sensor (Column 4 lines 19-22) and calculating the diffusible hydrogen concentration in the selected

portion of the object based on the measured amount of change in the physical property of the hydrogen sensor (Column 4 line 43-45). The predetermined sample time is 30 minutes (Column 5 lines 21-23), which falls within applicant's claimed range. Mansfield discloses a selected sample portion being a curved surface (Column 5 lines 60-62). A welded joint is a curved surface on a welding and Mansfield's invention was designed for use on a welding (Column 1 lines 13-15); therefore Mansfield's teaching encompasses selecting a welding joint as the sample area. Mansfield also anticipates waiting a cooling period prior to mounting the apparatus (Column 5 lines 62-64). Mansfield also teaches calibrating the hydrogen sensor wherein the calculating of the diffusible hydrogen concentration is based on collected calibrating information (Column 4 line 43 – Column 5 line 29). Mansfield teaches that the calibrating may be completed either prior to mounting the sensor assembly to the sample (Column 4 lines 28-29) or after mounting the sensor to the object and injecting a selected amount of hydrogen into the sample volume, allowing the hydrogen to react with the hydrogen sensor for a predetermined calibration time, and measuring the amount of change in the physical property of the hydrogen sensor (Column 4 line 39-Column 5 line 29; Fig 6). Mansfield teaches the calculations used to determine hydrogen concentration, calculations which are based on the surface area and sample volume (Column 3 lines 25-29). While Mansfield does not teach that these calculations are calibrated into the hydrogen sensor assembly, it would be obvious to supply a means for automatically calculating in place of manual calculations (See In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958)).

Mansfield teaches the advantages of the sensor design for measuring diffusible hydrogen concentrations as its small size (Column 1 lines 51-52), portability (Column 1 lines 51-52), ability to detect hydrogen diffusing from a solid, ability to take up hydrogen into a pre-defined volume (Column 1 lines 67-68), and ability to prevent hydrogen leakage while sampling (Column 1 lines 59-62). It would have been obvious to modify the apparatus from the Jelley patent which measures hydrogen in the air with the Mansfield design which measures hydrogen diffusing from an object to gain the advantages of its design features and create an apparatus that obtains accurate measures of the concentration of hydrogen diffusing from metals. In addition to the apparatus from Mansfield, it would have been obvious to modify the calibration steps from Mansfield to make a time-saving apparatus and method for obtaining hydrogen concentration.

12. Claims 1-3, 7-11, 13, and 19-23 and 25-27 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Mansfeld in view of Jelley. Mansfeld discloses a method and apparatus design for measuring diffusible hydrogen from solid metals by placing the hydrogen sensor against the surface of a metal part without spilling or leaking. Mansfield discloses a sensor housing with a hydrogen inlet (Figs. 2 and 4, part 24) sealing member (Fig. 2, part 26) sealably engageable with the object from which hydrogen diffuses and wherein the sealing member and sensor housing define a sample volume between the sample area on the object and hydrogen inlet of the sensor (Column 3 lines 25-29). This hydrogen sensing design includes a hydrogen monitoring

assembly (Fig. 5 part 56) operably connected to the sensor (Fig. 5) and adapted for measuring the property change in the hydrogen sensing area (Column 2 lines 13-16) and determining a diffusible hydrogen concentration based on the measured property change, the sample area and the sample volume (Column 3 lines 25-29 and Column 4 line 38-Column 5 line 15). The method comprises the steps of selecting from where to get the measurement (Column 1 lines 58-62), sealably mounting the hydrogen sensor assembly with a housing that defines a sample area and a sample volume (Column 3 lines 25-29) on a selected portion of the object (Column 1 lines 58-62), allowing the hydrogen sensor to react with the captured hydrogen for a predetermined sample time (Column 5 lines 21-23), measuring an amount of change in a physical property of the hydrogen sensor (Column 4 lines 19-22) and calculating the diffusible hydrogen concentration in the selected portion of the object based on the measured amount of change in the physical property of the hydrogen sensor (Column 4 line 43-45). The predetermined sample time is 30 minutes (Column 5 lines 21-23), which falls within applicant's claimed range. Mansfield discloses a selected sample portion being a curved surface (Column 5 lines 60-62). A welded joint is a curved surface on a welding and Mansfield's invention was designed for use on a welding (Column 1 lines 13-15); therefore Mansfield's teaching encompasses selecting a welding joint as the sample area. Mansfield also anticipates waiting a cooling period prior to mounting the apparatus (Column 5 lines 62-64). Mansfield also teaches calibrating the hydrogen sensor wherein the calculating of the diffusible hydrogen concentration is based on collected calibrating information (Column 4 line 43 – Column 5 line 29). Mansfield

teaches that the calibrating may be completed either prior to mounting the sensor assembly to the sample (Column 4 lines 28-29) or after mounting the sensor to the object and injecting a selected amount of hydrogen into the sample volume, allowing the hydrogen to react with the hydrogen sensor for a predetermined calibration time, and measuring the amount of change in the physical property of the hydrogen sensor (Column 4 line 39-Column 5 line 29; Fig 6). Mansfield teaches the calculations used to determine hydrogen concentration, calculations which are based on the surface area and sample volume (Column 3 lines 25-29). While Mansfield does not teach that these calculations are calibrated into the hydrogen sensor assembly, it would be obvious to supply a means for automatically calculating in place of manual calculations (See In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958)).

Mansfield does not disclose optical detection of hydrogen using a sensor assembly made of chemochromic material that changes optical transmissivity when it reacts with hydrogen. Nor does Mansfield teach a sensor assembly that uses an optical fiber for directing transmitted light to and reflected light from the sensing layer. Mansfield further teaches no reflector positioned within the housing connected to a reflectance-monitoring device or connecting a signal analyzer to a light signal detector.

Jelley discloses a method and apparatus for detecting gas consisting of a chemochromic sensor (Column 2 lines 10-17) and an optical fiber 20 for directing transmitted light to and reflected light from 24 the sensing layer 16. Jelley discloses a hydrogen monitoring assembly (Fig. 1 parts 22 and 26) operably connected to the sensor and adapted for measuring in the hydrogen-sensing layer a change in optical

transmission properties based on concentrations of reacted hydrogen (Column 4 lines 34-40). The sensing device includes a reflector layer 18 adjacent the sensing layer 16 for reflecting the transmitted light passing through the sensing layer back through the sensing layer and the optical fiber (Column 3 lines 42-45). The transmitted light has a wavelength of 850 nm (Column 3 lines 9-12). The reflector layer interposed between the sensing layer and the sample (Column 4 lines 10-12) comprises a material, palladium (Column 2 line 36), which adsorbs molecular hydrogen on a surface exposed to sample volume and releases the adsorbed hydrogen into the sensing layer (Column 4 lines 15-19). The reflector layer has a thickness range of 2.5 nm to "somewhat thicker" than 5 nm, and this reads on applicant's claimed range. The sensing apparatus includes a light source 22 for providing the transmitted light to the optical fiber 20 and a light detector 26 for receiving from the optical fiber the reflected light and for processing the reflected light to calculate an amount of hydrogen (Column 4 lines 34-40).

Fiber optic sensors are commonly known in the art as having advantages over electrochemical sensors including low manufacturing costs, alleviation of safety concerns (See Jelley Column 1 lines 30-35) and the versatility of the method (such as integrating absorption, reflectance and scattering). Jelley teaches that this hydrogen-sensing apparatus has the advantage of the light passing through the sensing layer twice, which increases the sensitivity to a change in absorption (Column 4 lines 58-61). It would have been obvious to modify the Mansfield hydrogen sensor specifically designed for measuring diffusible hydrogen from metal with Jelley's fiber optic sensor to lower manufacturing costs, increase safety to users, to take advantage of its versatility

and to gain the additional advantage of an increased sensitivity, thereby making better apparatus and method for determining diffusing hydrogen concentrations from metals. It would also be obvious to further modify the light source and reflectance-measuring device from Jelley with the combined apparatus of Mansfield and Jelley to complete the structure necessary for a functioning reflective optic sensor.

13. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mansfield and Jelley as applied to claims 1-3, 7-11, 13, and 19-23 and 25-27 above and further in view of Benson (USP 5,708,735). Mansfield and Jelley do not teach selecting the sensing layer from transition metal oxides. Benson discloses an apparatus for sensing gas wherein the sensing layer (Fig. 2 part 48) is made up of a porous chemochromic material selected from the group of transition metal oxides (Column 6 lines 22-24). Benson explicitly discloses the chemochromic material of tungsten trioxide (Column 6 line 24). Benson teaches that the optical properties of transition metal oxides change in the presence of certain gases. Benson further teaches the additional benefit that tungsten trioxide and like materials have a fast response time when exposed to hydrogen. It would have been obvious to one of ordinary skill in the art to modify the Mansfield Jelley sensor with the transition metal oxides such as tungsten trioxide disclosed by Benson in an optical hydrogen sensor to make a sensor with a faster response time.

14. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mansfield and Jelley as applied to claims 1-3, 7-11, 13, and 19-23 and 25-27 above and further in view of Szuchy (USP 4,734,577). Mansfield, Jelley and Benson are silent as to whether the light source in the optical sensor is a laser. Szuchy discloses a collimated beam generated by a laser focused upon a fiber (Column 1 lines 21-23). Szuchy teaches that the collimated beam results in relatively small internal intensity losses (Column 1 lines 21-26). It would have been obvious to one of ordinary skill in the art to make the light source a laser with a collimated beam in order to make an optical sensor that has minimal loss of light intensity and is therefore more energy efficient.

15. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mansfield, Jelley and Szuchy as applied to claim 12 above and further in view of Cramp (USP 4,600,310). Mansfield, Jelley and Szuchy do not disclose a light source transmitting light at intensities of 1-3 microWatts. Cramp discloses an optical fiber sensor consisting of a light source transmitting light at chemochromic materials with a wavelength of 400 to 800 nm and intensities of 1-3 microWatts (Figs. 3-5). Cramp provides wavelength and intensity data for a light source focused on chemochromic materials. In designing a chemochromic sensor apparatus, it would be obvious to use a light source at a wavelength and intensity approximating that taught to be effective for a chemochromic sensor.

16. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mansfield and Jelley as applied to claims 1-3, 7-11, 13, and 19-23 and 25-27 above and further in view of Carter (USP 6,328,932 B1). While combined Mansfield and Jelley teach calculating hydrogen concentration based on the light signal received by the light detector, they do not expressly teach a signal analyzer connected to the light detector for calculating the concentration. Carter discloses connecting a signal analyzer to the light signal detector (Fig 1 part 20) for receiving a signal from the light signal detector based on the received reflected portion, and for calculating the analyte concentration (Column 6 lines 40-45; Fig. 3). Carter teaches that providing a signal analyzer would enable display of the concentration of analyte (Column 6 lines 40-45). Therefore, it would have been obvious to modify Carter's apparatus for analyzing a signal with Mansfield and Jelley's device to enable display of the concentration of hydrogen.

Conclusion

17. Claims 14-18 have been elected with traverse. Claims 1-10 are rejected under 35 U.S.C. 112 first paragraph as based on a disclosure which is not enabling. Claims 1-10 and 21 are rejected under 35 U.S.C. 112 second paragraph for failing to particularly point out and distinctly claim the invention. Claims 1-13 and 19-27 are rejected under 35 U.S.C. 103(a) has having been obvious in light of a combination of the prior art as discussed above.

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nave (USP 5,783,152) discloses a fiber optic gas sensor that uses chemochromic materials and a reflective layer. Goswami (USP 5,405,583) discloses a gas sensor that uses chemochromic materials. Sato (USP 4,142,399) discloses a method for determining hydrogen concentration in a sample of metal. Hardy (USP 4,050,895) discloses a sensing device that uses sensing material that changes optical properties. Kane (USP 5,728,422) discloses an optical sensor with an optical fiber, a light source and light detector. Kane (USP 5,632,958) discloses an optical sensor with an optical fiber, a light source and light detector. Robillard (USP 5,436,167) discloses a fiber optics gas sensor. Glausinger (USP 5,939,020) discloses a chemical sensor that changes optical properties. Scripca (USP 6,096,560) discloses a method and apparatus for an optical gas sensor system.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keri A. Moss whose telephone number is 571-272-8267. The examiner can normally be reached on 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)272-1267. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Yelena Gakh

YELENA GAKH
PRIMARY EXAMINER